

Following, please find a MARKED UP VERSION OF CLAIMS 1, 3, 5, 7, 9, 18 and 19 showing all changes made relative to the previous versions of those claims –

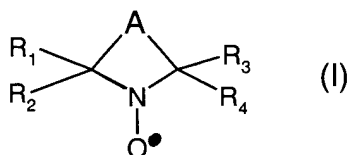
1. (Amended) A method of preparing modified fluffed pulp, the method comprising the steps of:

[a] treating] oxidizing cellulose pulp [with a nitroxide-mediated oxidation method] in a suitable medium with an oxidant in the presence of a nitroxide radical mediator; and

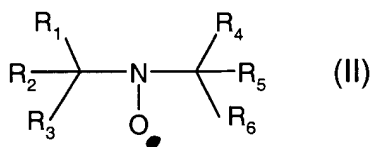
[b)] fluffing the treated cellulose pulp, [whereby] the treated cellulose pulp [containing] having from about 1 to about 50 mmole of aldehyde functionality[/] per 100 [g] grams of [cellulose] cellulose pulp;

wherein the modified fluff pulp has an increase in wicking rate and wicking capacity compared to an unmodified fluff pulp.

3. (Amended) The method of claim [2] 1 wherein the nitroxyl radical mediator [used herein] is a di-tertiary alkyl nitroxyl radical having a formula of



or



wherein A is a chain having two or three atoms; each atom is selected from the group consisting of carbon, nitrogen[, and oxygen; and the R<sub>1</sub>-R<sub>6</sub> groups represent the same or different alkyl groups.

5. (Amended) The method of claim [2] 1 wherein the treated cellulose pulp has from about 1 to about 20 mmole aldehyde groups[/] per 100 [g] grams of cellulose pulp.

7. (Amended) The method according to claim [2] 1 wherein the nitroxyl radical mediator is in an effective amount to mediate the oxidation.

9. (Amended) The method according to claim [2] 1 wherein the oxidant is an alkali or alkaline-earth metal hypohalite having an oxidizing power of from about 0.05 to about 15.0 [g] grams active chlorine per 100 [g] grams of substrate.

18. (Amended) A modified fluff pulp formed by oxidizing pulp in an aqueous medium with an oxidant in the presence of a nitroxide radical mediator and fluffing the pulp, the modified fluff pulp having [a simultaneous] an increase in wicking rate and wicking capacity as compared to an unmodified fluff pulp.

19. (Amended) A modified fluff pulp formed by oxidizing pulp in an aqueous medium with an oxidant in the presence of a nitroxide radical mediator and fluffing the pulp, the modified fluff pulp having from about 1 to about 50 mmole of aldehyde functionality[/] per 100 [g] grams of [cellulose] cellulose pulp, the modified fluff pulp further having an increase in structural integrity as compared to an unmodified fluff pulp.

## REMARKS

Claims 1-22 are pending in the application. Claims 1-22 are rejected. Claim 2 has been canceled. Claims 1, 3, 5, 7, 9, 18 and 19 are amended. Claims 23-27 have been added. No new matter is submitted with these Amendments.

### Reply to the Rejection of Claims 1-22 under 35 U.S.C. § 102(e)

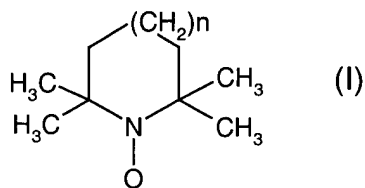
The Examiner has rejected Claims 1-18 as being anticipated by U.S. Patent No. 6,409,881 to Jaschinski ("Jaschinski"). Specifically, the Examiner states –

Jaschinski teaches modified fibers, oxidated at the C-6 of glucose units to form, in that unit, aldehyde and or carboxy groups, see abstract. Jaschinski teaches the use of TEMPO and derivatives to modify the fibers and teaches that the fibers can be fluffed to make absorbent structures, see column 3, lines 22-27 and column 24, line 57 through column 25, line 5. Jaschinski teaches also the same range of aldehyde in the modified fibers, see column 8, line 65 through column 9, line 3. Jaschinski teaches the use of the same oxidating agents and the same catalyst for the reaction see column 11, line 39 through column 16, line 27.

For the following reasons, Applicants respectfully traverse the Examiner's rejection of claims 1-22 as being anticipated by Jaschinski.

Referring to Jaschinski, therein is disclosed a method of producing metal-crosslinkable oxidized cellulose-containing fibrous materials. The fibrous material is produced by first oxidizing the OH functions at the glucose C-6 of the cellulose in cellulose-containing fibrous material into aldehyde and/or carboxy groups (col. 11, lines 40-44). This oxidized fibrous material is then crosslinked with a metal-containing crosslinking agent selected from transition metals of the groups IVa, Va, VIa, VIIa and VIIIa, Zn and Al (col. 11, lines 45-48).

"Oxidation of the starting material may be effected with any oxidizing agent that oxidizes the OH functions at the C(6) of the glucose unit of the cellulose . . . into aldehydes and/or carboxyl groups" (col. 12, lines 5-9). Such oxidizing agents include hypochlorite, hypobromite, hydrogen peroxide, nitroxy compounds, particularly TEMPO oxidizing systems, and suitable combinations thereof (col. 12, lines 9-21). Preferred oxidation systems are represented by the following formula I –



(col. 13, lines 4-28). The above formula I compounds include the optionally substituted TEMPO compounds (col. 13, lines 31-36). These TEMPO compounds can be hydroxy-, amino- or amido-substituted, *e.g.*, 4-hydroxy TEMPO and 4-acetamido TEMPO (col. 14, lines 55-60; col. 15, lines 8-10). The nitroso compound is used in an amount of 0.005 to 70 wt. % relative to the dry weight of the fibrous material (col. 13, lines 60-65).

Crosslinking of the oxidized fibers with a metal preferably occurs after oxidation, or, optionally, after the chemical treatment and/or washing stage to prevent the oxidizing agent from oxidizing the metal-containing crosslinking agent in use (col. 15, lines 42-46). Treatment with the crosslinking agent is possible during or just after the production of the oxidized fibrous material (col. 15, lines 46-48).

The total content of aldehyde and/or carboxyl groups at C-6 in the oxidized cellulose-containing fibrous material of Jaschinski is preferably more than 50 or more than 100  $\mu\text{mol/g}$  dry weight (oven-dried) of the fibrous material, particularly more than 150  $\mu\text{mol/g}$ . Greater preference is given to values of more than 200  $\mu\text{mol/g}$ , particularly more than 250  $\mu\text{mol/g}$  (col. 8, line 65 – col. 9, line 3).

It is well recognized that "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, *i.e.*, identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

As shown above, Jaschinski is directed towards a method of producing metal-crosslinkable oxidized cellulose-containing fibrous materials. The Jaschinski method requires a first step of oxidizing the starting material with any oxidizing agent that oxidizes the OH

functions at the C-6 of the glucose unit of the cellulose into aldehydes and/or carboxyl groups. The oxidizing agents include hypochlorite, hypobromite, hydrogen peroxide, nitroxy compounds, particularly TEMPO oxidizing systems, and suitable combinations thereof. The total content of aldehyde and/or carboxyl groups at C-6 in the oxidized cellulose-containing fibrous material of Jaschinski is preferably more than 50  $\mu\text{mol/g}$  dry weight (oven-dried) of the fibrous material. The second step of the Jaschinski method is to crosslink the oxidized fiber with metal to obtain the inventive products.

In contrast to Jaschinski, the treated cellulose pulp of the presently claimed invention is directed towards absorbent articles. While Jaschinski provides a laundry list of uses and products for the invention of Jaschinski, including absorbent articles (*see*, col. 3, lines 11-27), the inventive products of Jaschinski refer to those oxidized fibers that have been crosslinked with metal. Crosslinking the oxidized fibers with metal increases the strength of the product for use in paper applications (col. 15, line 67 - col. 16, line 9). Jaschinski makes no teaching or suggestion of the use of his fibers for improving absorbency. Further, Jaschinski does not teach or suggest that the oxidized fibers, without metal crosslinking, would enhance the absorbent properties of the product, including absorbent capacity, structural integrity, wicking rate, wicking capacity and odor reduction, as is claimed in amended claims 1, 18 and 19 and new claims 23-27. Accordingly, Jaschinski does not teach or suggest each and every element of the presently claimed invention, Jaschinski cannot be said to anticipate claims 1-22 and new claims 23-27.

It is believed that these remarks overcome the Examiner's rejection of claims 1-22 as being anticipated by Jaschinski under 35 U.S.C. § 102(e). Withdrawal of the rejection is respectfully requested.

#### **Reply to the Rejection of Claims 1, 13-15 and 18-20 under 35 U.S.C. § 103(a)**

The Examiner has rejected Claims 1, 13-15 and 18-20 as being unpatentable over U.S. Patent No. 5,698,688 to Smith *et al.* ("Smith"). Specifically, the Examiner states –

Smith et al. teach a paper made with aldehyde modified fibers, see abstract. Smith et al. teach also that the aldehyde groups increase the temporary strength of the fibers, see abstract and teach the fluffing of the fibers, see column 9, line 62 through column 10, line 7, (see the use of fibers for sanitary napkins, tampons, diapers, etc.). Even though Smith et al. are silent with respect to the number of moles of aldehydes in the fibers, Smith et al. teach that the presence of aldehyde

groups is evidenced by an increase of wet strength of the paper formed from the modified fibers and that the degree of oxidation can be readily optimized for a given fiber weight to obtain desired degree of aldehyde groups in the fibers and that it would be desirable to avoid over oxidation so to control the formation of carboxylic acids groups in the fibers, see column 7, lines 8-20. Therefore, it is clear that optimizing the degree of aldehyde to the claimed degree would have been obvious to one of ordinary skill in the art, in order to optimize the strength of the fibers.

For the following reasons, Applicants respectfully traverse the Examiner's rejection of claims 1, 13-15 and 18-20 as being unpatentable over Smith.

Referring to Smith, therein is disclosed aldehyde-modified cellulosic fibers formed by esterifying cellulosic fibers with a 1,2-disubstituted alkene that has at least one carboxylic acid group reactive with cellulosic hydroxyl groups and oxidizing the esterified fibers to form aldehyde groups (Abstract; col. 2, lines 41-50; col. 3, lines 14-16). "1,2-disubstitute" means that each of the doubly bonded carbons is singly bonded to once carbon atom other than the doubly bonded carbon atom and to a hydrogen atom (-HC=CH-) (col. 3, lines 24-27). With specific reference to the preferred 1,2-disubstituted alkene illustrated in column 6 of Smith, Smith describes *intermediate cellulosic fiber* compositions made by esterifying cellulose with an olefin (*i.e.*, double bond contained within an aliphatic ring) containing carboxylic acid or acid derivative (acid amide) (*see*, col. 3, lines 14-23).

Once esterified, this intermediate cellulosic fiber is then oxidized to form the modified cellulosic fibers of Smith (col. 6, 19-21; see the resultant modified cellulosic fiber structure illustrated in column 7 of Smith). "Oxidation is accomplished by contacting the intermediate cellulosic fibers with an oxidizing agent under conditions to cause the formation of aldehyde groups on the residue of the carboxylic alkene" (col. 6, lines 26-29). Oxidizing agents include ozone and potassium, with ozone being preferred (col. 6, lines 49-50).

As seen above, Smith teaches a first step of esterification of cellulosic fiber with an olefin containing carboxylic acid or acid amide. The intermediate cellulosic fiber produced is then in a second step oxidized to form the resultant aldehyde-modified cellulosic fiber. Using the invention of Smith, the amount of acid/aldehyde that can be introduced to the fiber is controlled by the degree of derivatization with (or, esterification of) the olefin containing carboxylic acid. Accordingly, Smith teaches oxidizing the alkene groups substituted on the fiber (see the structure illustrated in column 6), *i.e.*, oxidizing the double bond to an aldehyde. In contrast to Smith, the

present invention teaches oxidation of a hydroxyl group to an aldehyde that occurs by an entirely different process. Simply because double bond oxidation may produce an aldehyde or that aldehyde content may be controlled thereby does not suggest to one skilled in the art that oxidation via an entirely different process will produce the same result.

As the aldehyde-modified fibers of Smith are different from those fibers of the present invention, no optimization exercise will enable one of ordinary skill in the art to obtain the modified compositions of the present invention. Further, no optimization exercise will allow one of ordinary skill in the art to anticipate the absorbent article properties of the present invention.

Further, Smith does not teach the method of modifying cellulose pulp with an oxidant in the presence of a nitroxide radical mediator. Instead, the process of Smith first requires the step of creating an intermediate (modified) cellulose pulp before modifying that intermediate pulp with an oxidant. Smith does not teach or suggest the use of a nitroxide radical mediator, particularly the use of such a mediator with the oxidant. As such, the method of Smith is completely different from the method of the present invention and cannot be said to render the present invention obvious.

"In determining the propriety of the Patent Office case for obviousness in the first instance, it is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed substitution, combination, or other modification." *In re Linter*, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972).

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. "The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

As shown above, Smith is directed towards esterification of cellulosic fiber with an olefin containing carboxylic acid or acid amide, and then oxidizing the intermediate cellulosic fiber produced to form the resultant aldehyde-modified cellulosic fiber. Smith does not teach or suggest the single step of oxidizing cellulose pulp in a suitable medium with an oxidant in the presence of a nitroxide radical mediator in order to obtain a cellulose aldehyde derivative. Accordingly, Smith does not teach or suggest the presently claimed invention.

Further, the products of Smith always create a 1:1 ratio of aldehyde to carboxyl groups on the derivative (see the structure illustrated in column 7). In contrast, in the nitroxy mediated oxidation process of the present invention, aldehyde and carboxyl functional groups are created directly on the cellulose, and not on a derivative as in Smith. As such, the compositions of Smith differ from the compositions of the present invention.

Finally, claim 2 has been canceled. Claim 1 has been amended to incorporate the limitations of claim 2. It is noted that the present rejection does not include claim 2. Accordingly, the rejection of claims 1, 13-15 and 18-20 as being unpatentable over Smith should be moot. The above arguments are provided in further support of the withdrawal of this rejection.

It is believed that these remarks overcome the Examiner's rejection of claims 1, 13-15 and 18-20 as being unpatentable over Smith under 35 U.S.C. § 103(a). Withdrawal of the rejection is respectfully requested.

**Reply to the Rejection of Claims 2-12, 16, 17, 21 and 22 under 35 U.S.C. § 103(a)**

The Examiner has rejected Claims 2-12, 16, 17, 21 and 22 as being unpatentable over Smith in view of the Tetrahedron article by Arjan E. J. de Nooy *et al.* (Tetrahedron, *Selective Oxidation of Primary Alcohols Mediated by Nitroxyl Radical in Aqueous Solution. Kinetics and Mechanism.*, Vol. 51, No. 29, pp. 8023-8032 (1995)) ("de Nooy"). Specifically, the Examiner states –

Smith et al. Invention has been previously discussed, see above. Smith et al. fail to teach the use of nitroxyl radicals as claimed in claims 16-22 and 24-25. However, Nooy et al. teach that primary and secondary alcohols, such as the one in cellulose can be oxidized to aldehyde and/or carboxylate depending on the reactions conditions and the substrate, see page 8023 and teach in page 8027 that using inorganic [*sic*, organic] solvents without water or with low concentrations of



water the reaction stops at the aldehyde stage. Therefore, the use of nitroxyl Radical containing compounds, such as TEMPO, to form aldehyde modified fibers such as the ones disclosed by Smith et al. would have been obvious to one of ordinary skill in the art, since one of ordinary skill in the art would have reasonable expectation of success if Nitroxyl Radical containing compounds are used. One of ordinary skill in the art would find that increasing the aldehyde content of fibers using Nitroxyl Radical is another viable alternative, in view of Nooy et al. teachings.

For the following reasons, Applicants respectfully traverse the Examiner's rejection of claims 2-12, 16, 17, 21 and 22 as being unpatentable over Smith in view of de Nooy.

Smith has been discussed previously, those arguments being incorporated herein. Referring to de Nooy, therein is disclosed the results of a study of the kinetics of TEMPO-mediated oxidation of methyl  $\alpha$ -D-glucopyranoside to sodium methyl  $\alpha$ -D-glucopyranosiduronate (Abstract, p. 8023). de Nooy states that the use of stable organic nitroxyl radicals such as TEMPO as mediators for the oxidation of primary and secondary alcohols is well known (p. 8023, 1<sup>st</sup> paragraph). de Nooy further states that the oxidation of primary alcohols stops at the [intermediate] aldehyde stage before obtaining the acid when the reaction occurs in organic solvents **without water or with only a low concentration of water** (p. 8027, 1<sup>st</sup> full paragraph). de Nooy then concludes "that the hydrated aldehyde intermediate is oxidised in the same way as alcohol" (p. 8027, 1<sup>st</sup> full paragraph). de Nooy makes no mention of possible conditions for isolating aldehyde from this chemistry other than reducing or eliminating water from the solvent.

In contrast to de Nooy, the present invention is able to control the oxidation of the cellulose pulp to the aldehyde stage in the presence of water as the sole reaction media, *i.e.*, very large concentrations of water (see Specification: p. 5, lines 3-6; p. 9, lines 8-9; p. 10, lines 16-17; Example 1). Accordingly, de Nooy teaches away from the presently claimed invention. As such, even if one skilled in the art were to combine the teachings of de Nooy with the teachings of Smith, one still would not be lead to the cellulose aldehyde derivatives of the present invention and their method of production. Instead, based on the teachings of de Nooy as indicated above, one skilled in the art would be taught away from the presently claimed invention.

It is believed that these remarks overcome the Examiner's rejection of claims 2-12, 16, 17, 21 and 22 as being unpatentable over Smith in view of Nooy under 35 U.S.C. § 103(a). Withdrawal of the rejection is respectfully requested.

**Reply to the Rejection of Claims 1-22 under 35 U.S.C. § 103(a)**

The Examiner has rejected Claims 1-22 as being unpatentable over U.S. Patent No. 6,228,126 to Cimecioglu *et al.* ("Cimecioglu") in view of Smith or Jaschinski. Specifically, the Examiner states –

Cimecioglu *et al.* teach aldehyde modified fibers for papermaking use with all the limitations of the claimed fibers. Cimecioglu *et al.* do not implicitly teach the fluffing of such fibers nor the use of the fibers as such, fluffed, for absorbent products. However, Both Smith *et al.* and Jaschinski, as discussed above teach that aldehyde modified fibers can be used as fluff, i.e., the fibers can be fluffed and used in absorbent structures such as diapers, pantliners etc, (fibers used in those applications are fluffed for additional wicking, bulk and fluid retention). Therefore, fluffing Cimecioglu *et al.* fibers for making the incontinent articles as taught by Smith *et al.* would have been obvious to one of ordinary skill in the art, since he/she would have reasonable expectation of success if the fibers are fluffed as taught by Smith *et al.* Note that Cimecioglu *et al.* teach the same degree of aldehyde in the fibers and the same type of additives, i.e., TEMPO and TEMPO derivatives.

For the following reasons, Applicants respectfully traverse the Examiner's rejection of claims 1-22 as being unpatentable over Cimecioglu in view of Smith or Jaschinski.

Smith and Jaschinski have been discussed previously, those arguments being incorporated herein. As shown above, Smith is directed towards a completely different chemistry. Accordingly, one skilled in the art would not be motivated to combine the method of Smith with that of Cimecioglu as both inventions refers to different processes and products.

As noted by the Examiner, Cimecioglu does not teach or suggest the fluffing of such fibers nor the use of the fibers as such, fluffed, for absorbent products. As shown above, Jaschinski does not teach or suggest the use of cellulose pulp that has been oxidized in a suitable medium in the presence of a nitroxide radical mediator for absorbent products. As shown above, the products of the Jaschinski reference have been crosslinked with a metal for improving paper strength. Jaschinski only mentions the use of his metal crosslinked products in a laundry list of uses as including absorbent articles. The invention of Jaschinski is directed towards improving paper strength, and provides no support or teaching that those products would improve wicking rate and wicking capacity, structural integrity, absorbent capacity, and/or odor absorption as claimed. Accordingly, even if one skilled in the art were motivated to combine Cimecioglu with Jaschinski, one still would not have the products and processes of the present invention.

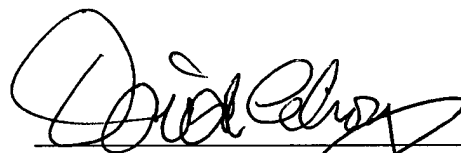
It is believed that these remarks overcome the Examiner's rejection of claims 1-22 as being unpatentable over Cimecioglu in view of Smith or Jaschinski under 35 U.S.C. § 103(a). Withdrawal of the rejection is respectfully requested.

It is believed that the above amendments and remarks overcome the Examiner's rejection of the claims under 35 U.S.C. §§ 102(e) and 103(a) as indicated herein above. Withdrawal of the rejections is therefore respectfully requested. Allowance of the claims is believed to be in order, and such allowance is respectfully requested.

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